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Preliminary

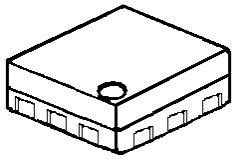
Single-phase DC Brushless Motor Driver IC

■GENERAL DESCRIPTION

The NJU7332 is a single-phase DC brushless motor driver IC for very small fan-motor application. It features MOS-FET driver circuit for better saturation characteristics. Slew late of amplifiers and feedback resistors are optimized to achieve low-noise motor operation.

NJU7332 adopt a very small FFP package, therefore it is suitable for micro motor applications.

■PACKAGE OUTLINE

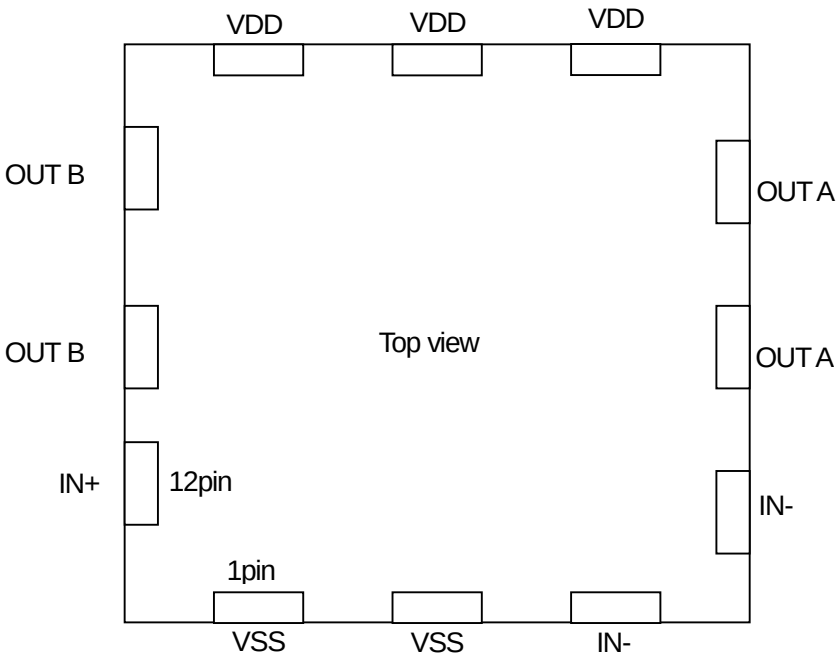


NJU7332PB1

■FEATURES

- Single Supply
- Operating Voltage V_{DD}=2.4 ~ 5.5V
- Low Operating Current
- Low Saturation Output Voltage
  Vsat=±0.2V @Io=±100mA
- C-MOS Technology
- Package Outline FFP12 (2×2×0.85mm)

■PIN CONFIGURATIONS



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■ ABUSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	RATINGS	SYNBOL(unit)	NOTE
Supply Voltage	+7.0	V_{DD} (V)	
Input Voltage	-0.3 ~ V_{DD}+0.3	V_{ID}(V)	
Operating Temperature Range	-40 ~ +85	Topr (°C)	
Storage Temperature Range	-50 ~ +150	Tstg (°C)	
Power Dissipation	300	P_D (mW)	1)

1) When mounted on a grass epoxy board.

■ RECOMMENDED OPERATING CONDITIONS

V_{DD}=2.4V~5.5V

■ ELECTRICAL CHARACTERISTICS

(V^+=5V, Ta=25°C)

PARAMETER	SYSMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I_{DD}	-	-	3.0	4.0	mA
Input Offset Voltage	V_{IO}	-	-10	-	-10	mV
Input Common Mode Voltage Range	V_{ICM}	-	0.4~4.0	-	-	V
Maximum Output Voltage Range	V_{OM}	Io=+100mA	4.70	4.80	-	V
Feedback Resistance	R_F	Io= -100mA	-	0.20	0.30	kΩ
		-	22.0	27.5	33.0	
Open Loop Gain	Av	-	-	80	-	dB

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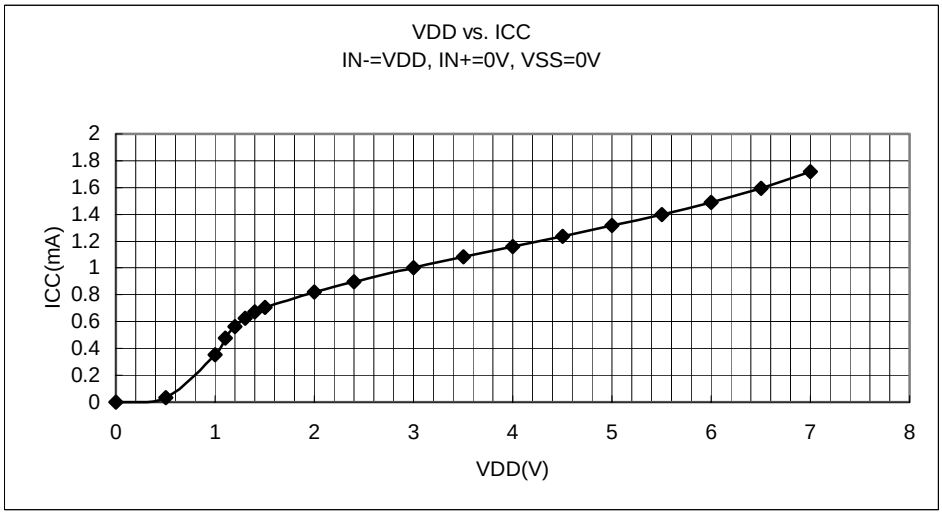
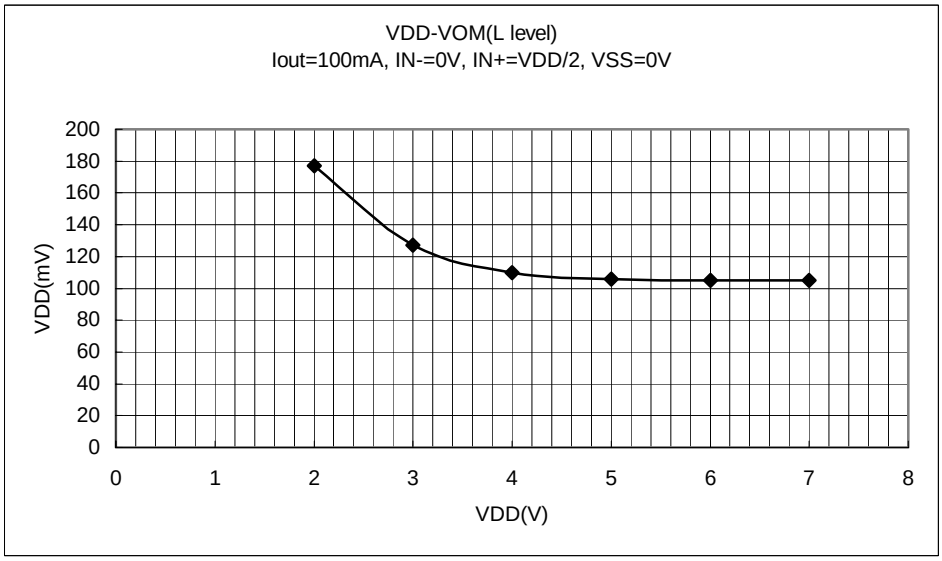
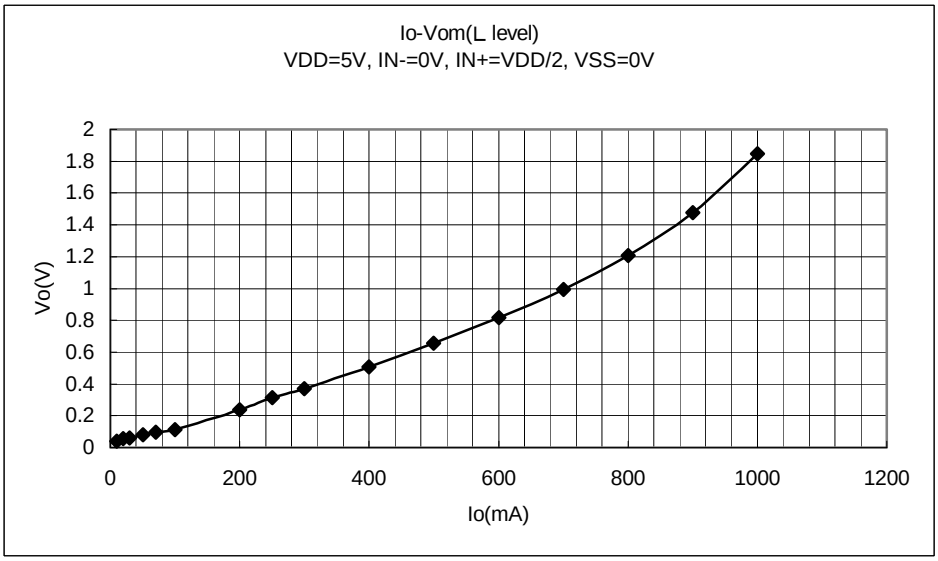
■TYPICAL CHARACTERISTICS







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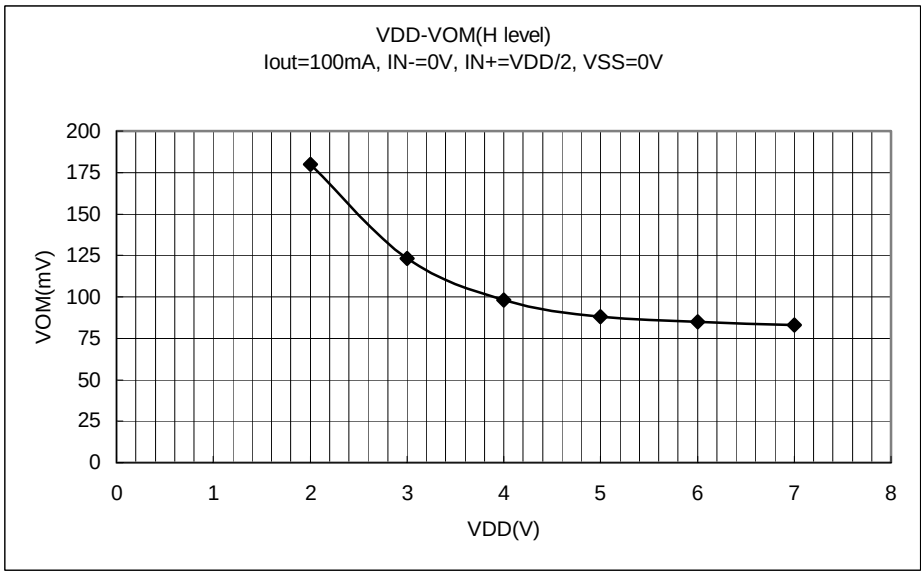
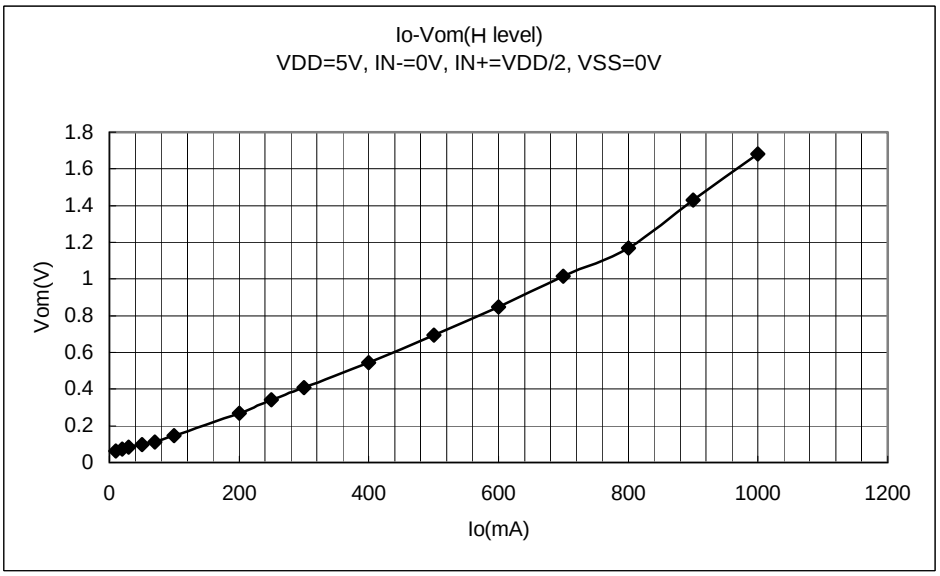
■TYPICAL CHARACTERISTICS



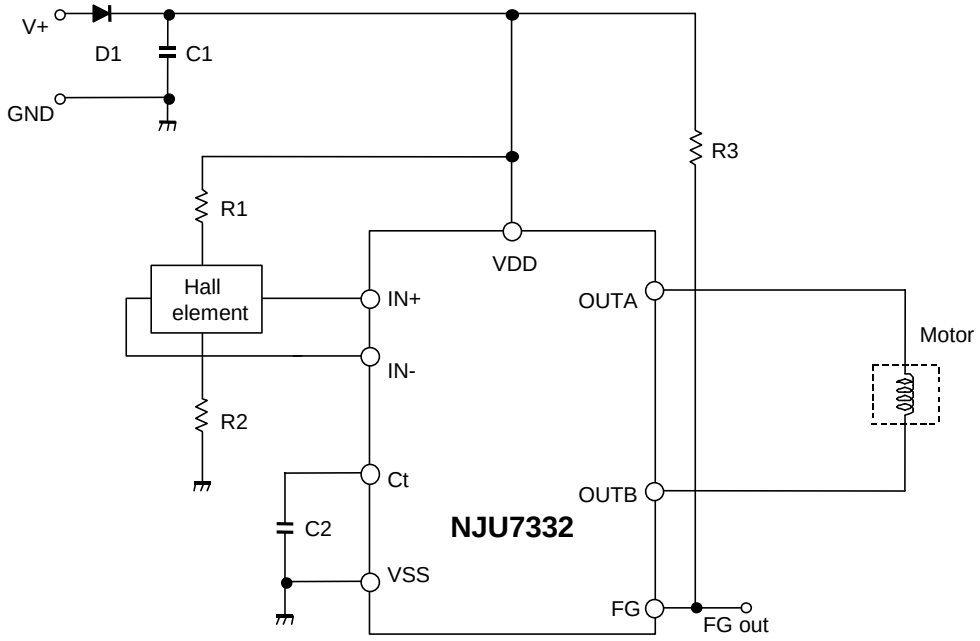


■ APPLICATION NOTE

The NJU7332 is a single-phase DC brushless motor driver IC featuring CMOS process.

It is suitable for fan motor drivers for a small equipment such as the note personal computers.

[Application Circuit Example]



[Design Notes]

Above application example is designed for 5V operation with motor current of 100mA. It uses the following components:

Hall Elements: HW101A (AKE)

1. Selection of C1 and D1:

C1 is used for a noise reduction purpose. A typical value is 0.1uF.

Optimize the value in actual operating conditions if necessary. D1 is a diode for protection against reverse voltage supply. Silicon rectifier diode (WO3C, 10D1 and equivalent) is appropriate.

2. Design of hall element bias resistance (**R1 and R2**)

Hall amplifier is a differential amplifier with hysteresis characteristics (24mV typical).

The common-mode input voltage is between 0.4V and VDD-1V and the input signal must be within the range.Non-excitation hall bias voltage is to be set at a half of VDD for effective use of common-mode input voltage range. Therefore the same value of hall bias resistors is selected for R1 and R2.

Given that the bias current is set to be 5mA by HW101A datasheet, R1 and R2 can be determined as

$$R1 + R2 + Rin = \frac{VDD}{Ihbias} = \frac{5}{5\times10^{-3}} = 1k\Omega$$

$$R1 = R2 = 300\Omega$$

follows:

The output voltage of hall elements is influenced by the bias current and magnetic flux density of hall elements.

The optimum input voltage of NJU7332 is 100mVp-p and higher. With such input voltage, the highest efficiency can be obtained.

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